

PHIN Alerting: Cascade Protocol and Vocabulary

**Proposal of the
Alerts and Communications Users Group**

2nd PHIN Conference

May 26th 2004
Tom Russell
Tim Boorman



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Agenda

- Alerts & Communication work group
- Technology overview
- Cascade Alerting Framework
- Common Alerting Protocol
- Proposed interim solution
- PHIN alerting vocabularies
- PHIN Vocabulary Service



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Work Group

Partner meeting on alerting requirements, 3/9/04

State HDs, Local HDs ASTHO, NACCHO, CDC



Alerts & Communications Users Group (ACUG), 3/16/04

Task: develop PHIN alert protocols



**Alert and Communication
Protocols Workgroup**
Task: business protocols



**PHIN Alerting Network
Architecture & Modeling
workgroup, 3/24/04**

Task: technical specifications:

- directory exchange
- directory privacy
- **cascade alerting**
- **role vocabulary**



**Redundant
Communications
Workgroup**
Task: failover
technologies



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Alerts and Communications User Group

PHIN Alerting Network Architecture & Modeling workgroup

- | | |
|--------------------|--------------------------------------|
| ■ John Abellera | CSTE |
| ■ Tim Boorman | Washington |
| ■ Robb Chapman | CDC |
| ■ Bill Colville | Michigan |
| ■ Kevin Cueto | Nebraska |
| ■ Richard Draut | CDC (Contractor) |
| ■ Janet Fath | CDC (Epi-X) |
| ■ Nedra Garrett | CDC |
| ■ Bob Hall | California |
| ■ Larry Hanrahan | Wisconsin |
| ■ Tony Pruitt | CDC (Contractor) |
| ■ Terry Puls | CDC (Epi-X) |
| ■ Gilberto Ramirez | CDC (HAN) |
| ■ Tom Russell | CDC (Contractor) |
| ■ Gregory Smith | Public Health Foundation Enterprises |
| ■ Debra Sottolano | New York State |
| ■ Art Thacher | Maryland |
| ■ Anthony Zenk | Alaska |



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Work group directives

- Focus on technical specifications
- Don't get stuck on “business rules” or policies
- Use applicable industry standards



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Technology Overview

- **Common Alerting Protocol (CAP)** – is a simple, flexible data interchange format for Public Health alerting
- **PHIN Messaging System (PHINMS)** - CDC's implementation of the ebXML 2.0 messages service standards
- **Simple Mail Transfer Protocol (SMTP)** - a protocol for sending e-mail messages between servers



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Direct Alerting

Direct Alerting – An Alerting Systems ability to send alerts directly to an associated recipient using a variety of communication devices. (e.g. email, PDA, fax, cell phone etc.)

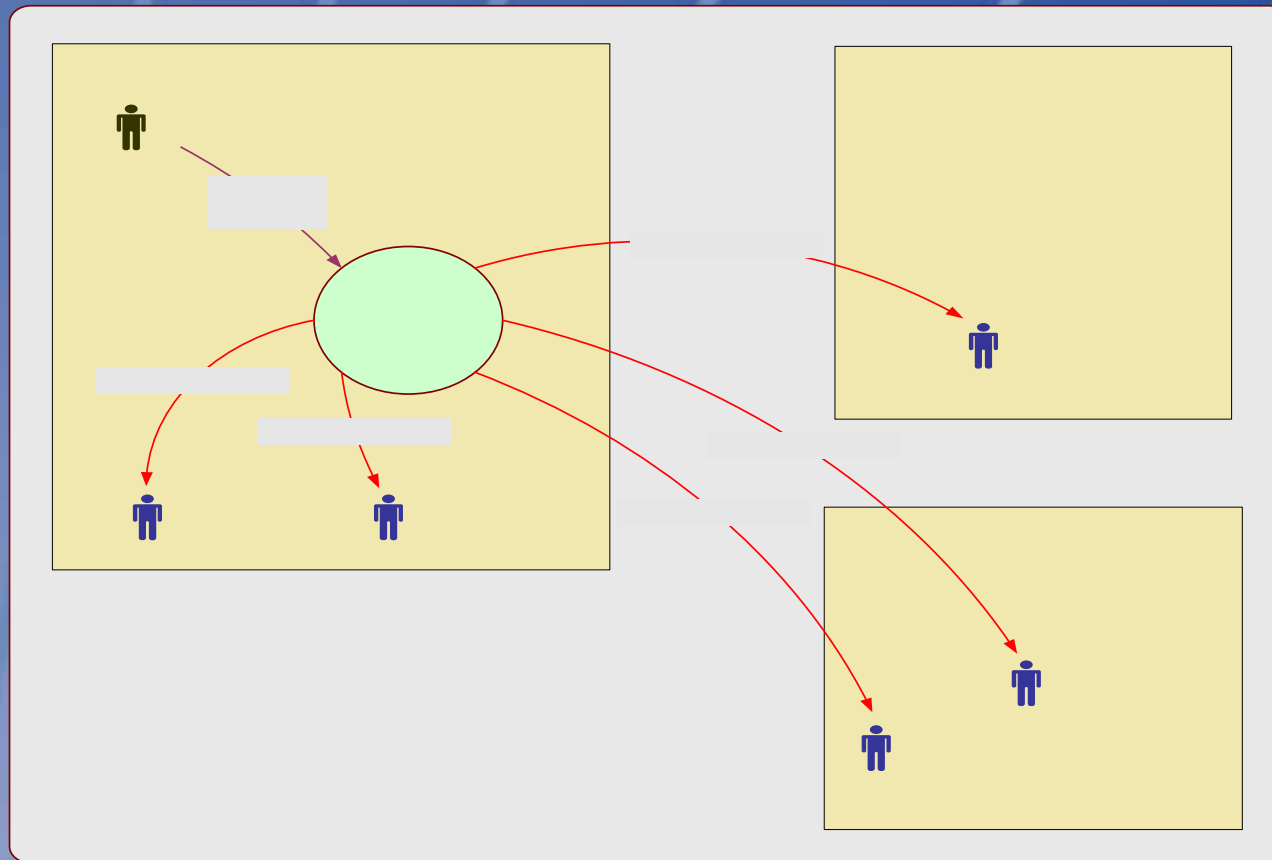


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PHIN Alerting

Direct Alerting



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Cascade Alerting

Cascade Alerting – An Alerting Systems ability to send alerts directly to another “*PHIN*” compliant Alerting System. Recipients may be referenced directly or by Role.

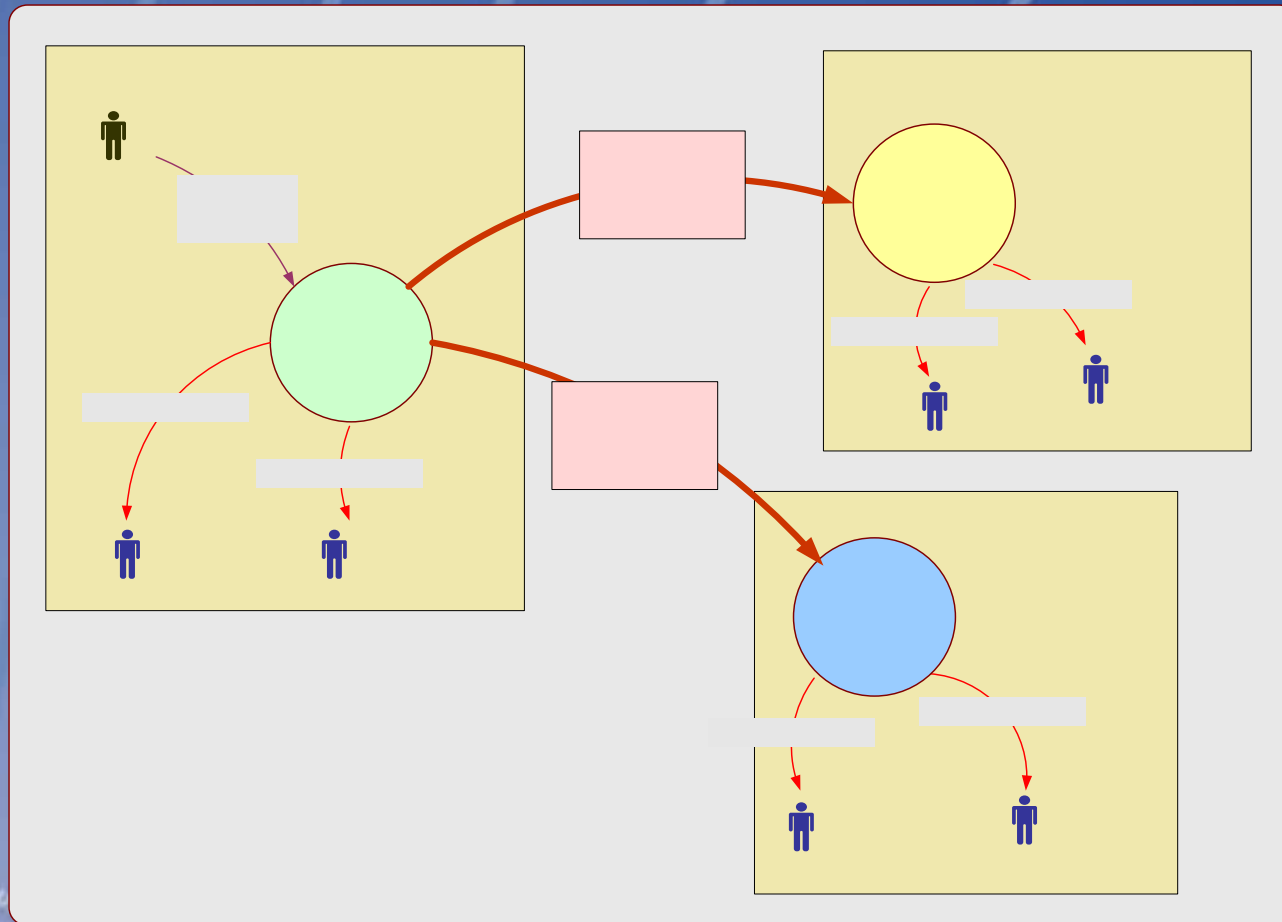


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PHIN Alerting

Cascade Alerting



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Part

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Considerations with Cascade Alerting?

- We understand that the implementation of direct alerting requires better defined/understood policies
- We determined that system-to-system alerting can be a viable solution to supplement direct alerting
- We understand that our partners have spent a lot of time and money into developing their own alerting solutions
- We also understand that there will be additional integration required by our partners to implement this solutions



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Cascade Alerting Framework

Our proposal for Cascade Alerting



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Cascade Alerting objectives

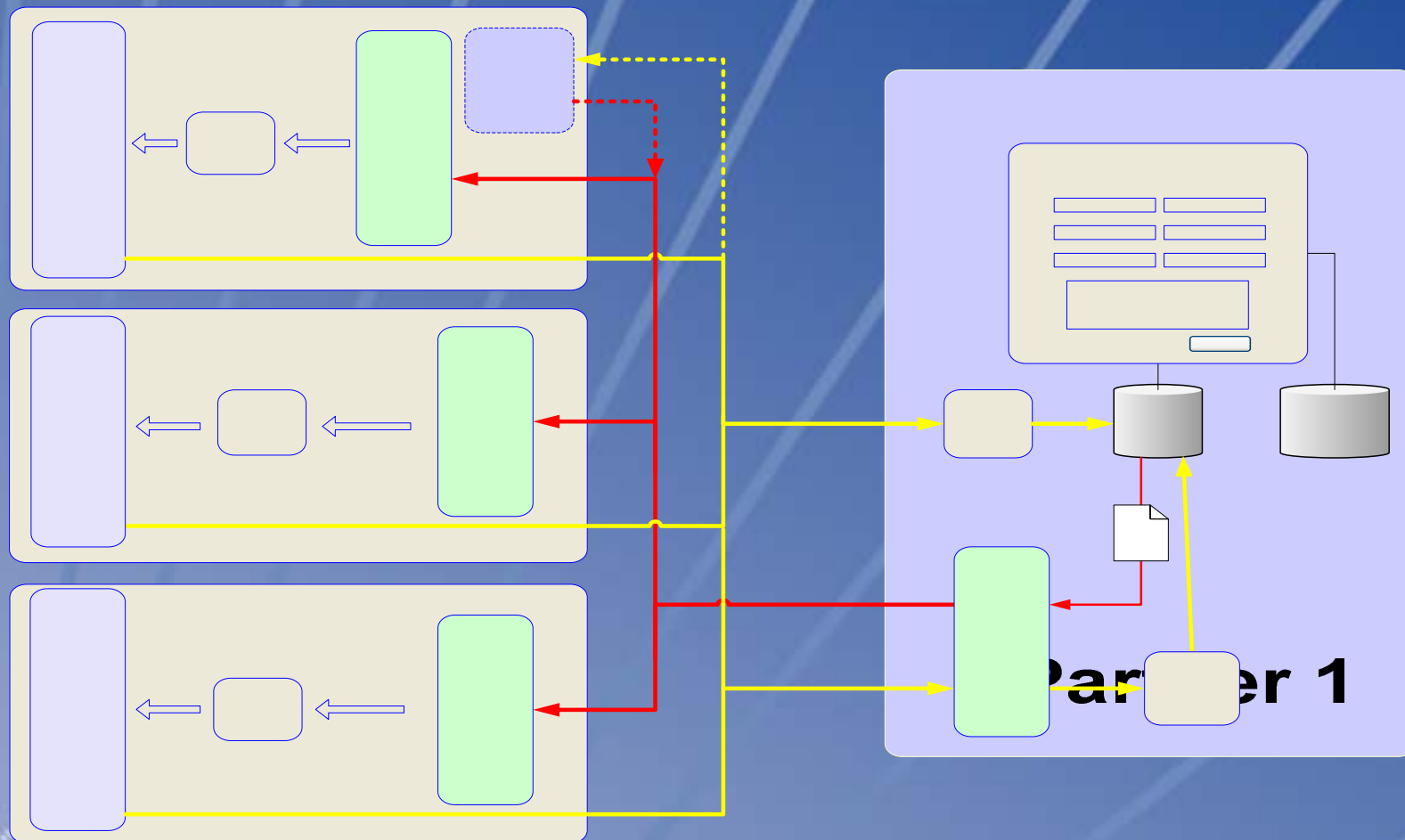
- Develop a cross-jurisdictional solution for secure alerting between “*PHIN*” compatible alerting systems
- Integrate with pre-existing alerting system
- Define a standard for structuring alert messages
- Define a set of vocabularies to support alerting



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Cascade Alerting Framework "Big Picture"



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Alerting
System

Mapper

Messaging System

Cascade Alerting Framework components

- Proposed web-enabled client application application for issuing alerts
- Common Alerting Protocol (CAP) used to structure the data elements associated with an alerts
- PHIN Messaging System (PHINMS) for guaranteed transmission of alerts



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Cascade Alerting Framework

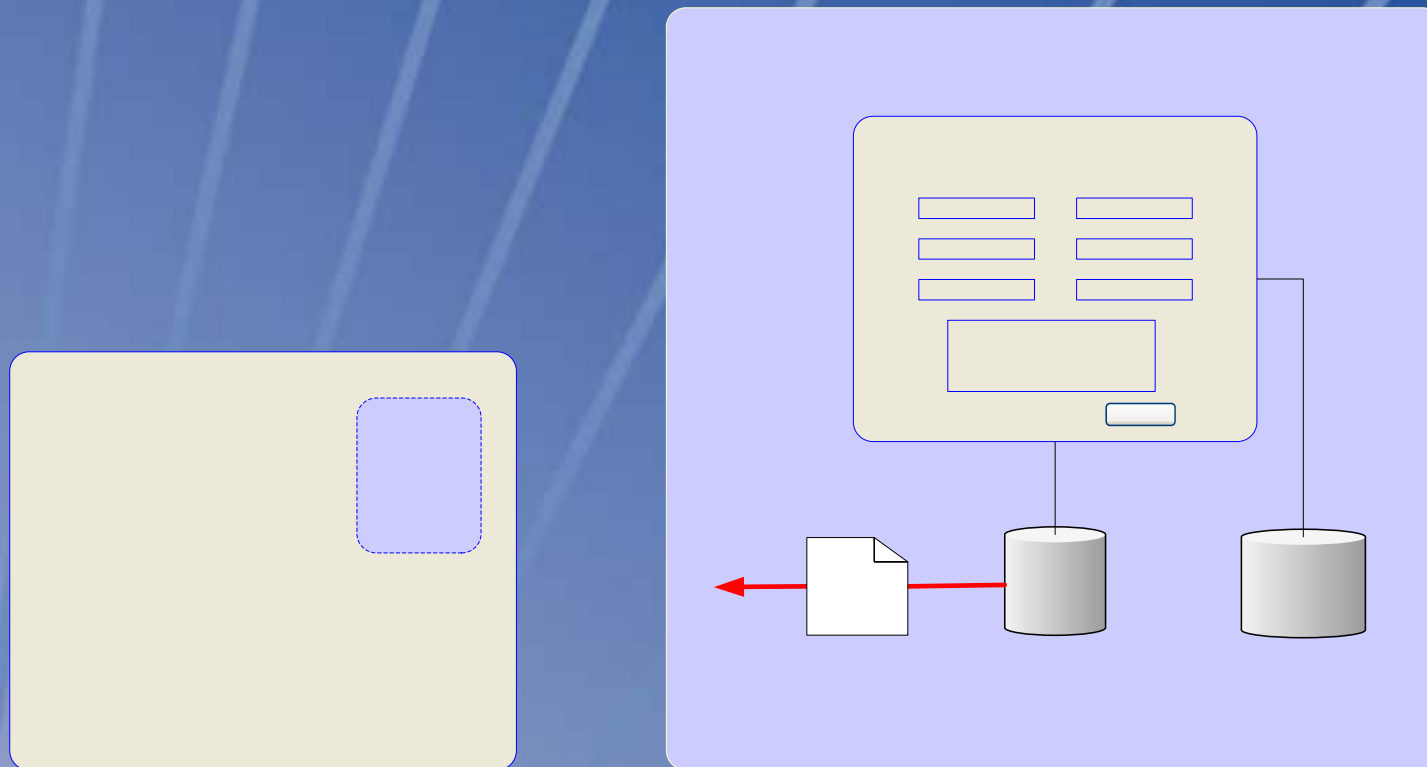
Client Application



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Cascade Alerting Framework "client application"



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Cascade Alerting Framework “client application”

Application Features

- Web-enabled client application used to issuing and monitoring alerts and notifications.
- Public Health directory for maintain information about people, organizations and roles.
- Ability to generate a alert message based on a industry standard protocol (CAP)



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Common Alerting Protocol

Message Definition



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What is the CAP?

- Simple and general format for exchanging emergency and Public Health alerts over all types of networks
- Provides an open, non-proprietary digital message format for all types of alerts and notifications
- Developed by emergency managers and technologists worldwide
- Used to structure an alert into a format that can be easily understood by other systems
- Defines a vocabulary specifically focused on alerting



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Why use the CAP?

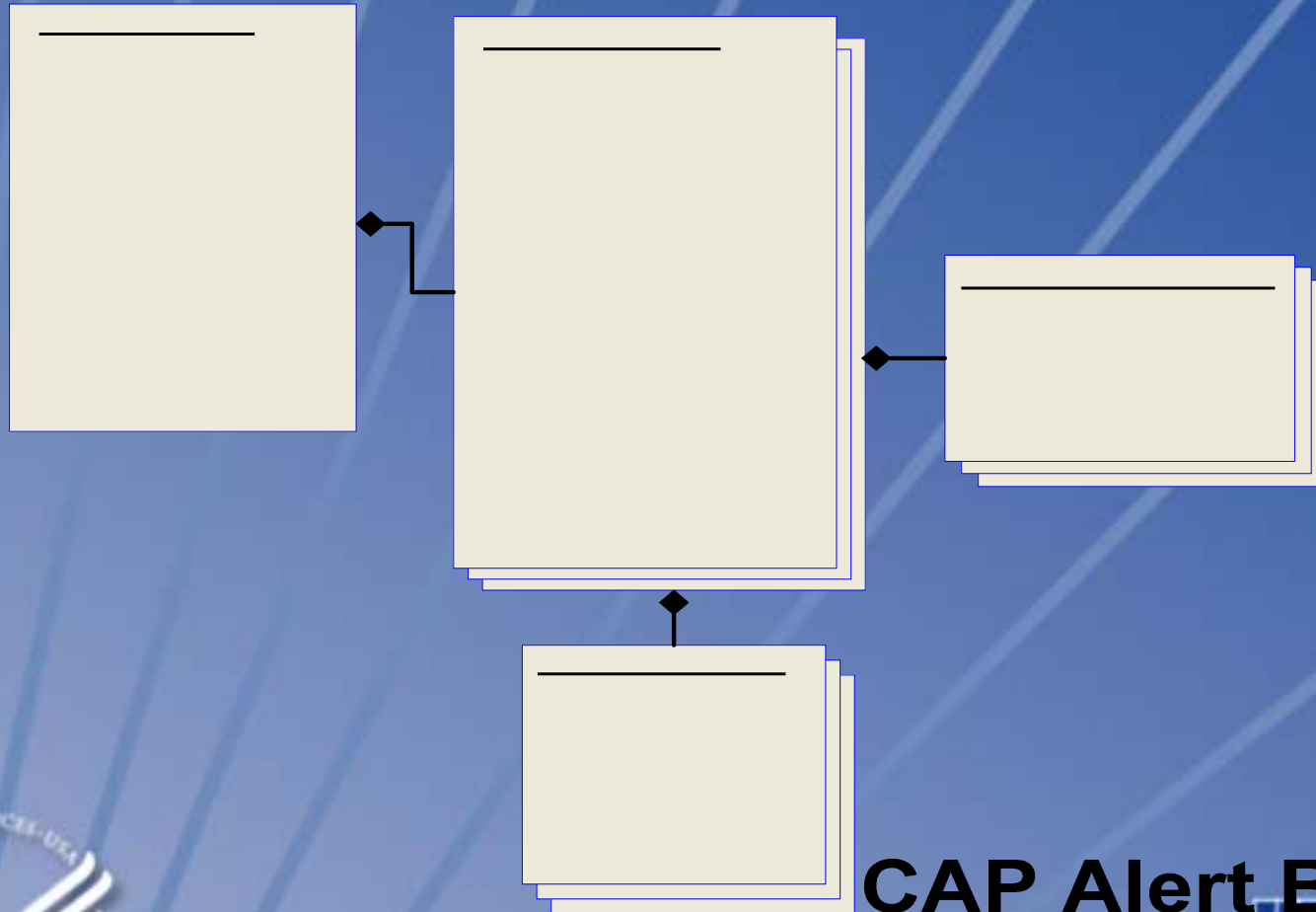
- Developed using industry standards
- Supported by the OASIS standards consortium (a technology standards body)
- Focuses on emergency alerting and public warning.
- Developed by 130 emergency-management practitioners, technologists and academic experts
- Endorse by many governmental agencies including Department of Homeland Security.



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Alert Message Structure



CAP Alert Block



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Message ID
Sender ID
Sent Date/Time

CAP Alert Block

identifier	A unique number identifying this message, assigned by the sender .
sender	The OID of the organization sending the alert.
operator/Device ID	Human readable text describing the alerting system that originated this alert. (e.g. "New York State PHIN Alerting System.")



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CAP Alert Block (continued)

sent	The time and date off the origination of the alert message.
Status *	The code denoting the appropriate handing of the alert. (e.g. Actual, Exercise or Test)
scope	The code denoting the intended distribution. For PHIN purposes, we will use only “Restricted”.

* Controlled Vocabulary



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CAP Alert Block (continued)

restriction	A human-readable text rendering of the distribution criteria specified in info.audience, info.parameter:LEVEL, and area.geocode.
msgType *	The code denoting the nature of the alert message. (e.g. Alert, Update, Cancel, Ack and Error)

* Controlled Vocabulary



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CAP Alert Block (example)

```
<?xml version="1.0" encoding="UTF-8"?>  
<alert xmlns="http://www.incident.com/cap/1.0">  
  <identifier>43b08777</identifier>  
  <sender>10.2.34.2.1</sender>  
  <sent>2004-04-28T14:39:01-05:00</sent>  
  <status>Actual</status>  
  <msgType>Alert</msgType>  
  <source>CDC Alerting System</source>  
  <scope>Restricted</scope>
```



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CAP Info Block

info	The container for all component parts of the info sib-element.
language	The code denoting the language of the info sub-element of the alert.
Category *	The code denoting the category of the subject event of the alert. For PHIN value will be defaulted to "Health" until other are added.

* Controlled Vocabulary



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CAP Info Block (continued)

event	Human readable text describing the type of event.
urgency *	The code denoting the urgency of the subject event of the alert. We will be adding the following to the standard: “PHIN Alert”, “PHIN Advisory” and “PHIN Notification”
severity *	The code denoting the severity of the subject event of the alert.

* Controlled Vocabulary



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CAP Info Block (continued)

certainty *	The code denoting the certainty of the subject event of the alert. (e.g. “Very Likely”, “Highly Likely”)
audience	Used to specify a list of <i>Public Health Roles</i> to which this alert is to be distributed.
effective	The effective time of the information of the alert.
onset	The expected time of the beginning of the subject event of the alert.

* Controlled Vocabulary



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CAP Info Block (continued)

expires	The expire date and time of the information of the alert.
sender name	Human readable name of the organization sending the alert.
headline	The “Subject:” text of the alert message.
description	The text describing the actual alert message.
instruction	Recommended or required action that should be taken by recipients of the alert.



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CAP Info Block (continued)

contact	Name of the person responsible for providing follow-up and further information. Contact information should be included. Required for all “Urgent” alerts.
parameter	Group of additional parameters associated with the alert. PHIN alerting will use two PHIN-specific parameters. LEVEL with values of (“Federal”, “State”, “Local”) and SENSITIVITY with values of (“yes”, “no”)



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CAP Info Block (example)

<info>

<category>Health**</category>**

<event>SARS**</event>**

<urgency>PHIN Alert**</urgency>**

<severity>Severe**</severity>**

<certainty>Unknown**</certainty>**

<audience>Epidemiologist**</audience>**

<effective>2004-04-28T14:39:01-05:00**</effective>**

<senderName>CDC Health Officer**</senderName>**

<headline>China reports suspected case of SARS**</headline>**

<description>BEIJING (AP) - China reported two suspected cases of SARS in Beijing and in the eastern province of Anhui on Thursday, the first cases in those areas since the country's initial outbreak of the highly contagious disease subsided last summer.

</description>

<instruction>Please review all SARS related information posted at CDC website.**</instruction>**

<contact>Tom Russell**</contact>**

<parameter>LEVEL=State**</parameter>**

<parameter>SENSITIVITY=yes**</parameter>**



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CAP Area Block

area	The container for all component parts of the area sub-element of the info sub-element of the alert.
area description	The text describing the affected area of the alert.
geocode	The geographic code delineating the affected area. PHIN alerting will use <code><geocode>fips1=xxx</geocode></code> where xxx can be a 2 digit state fips code or a 5 digit code consisting of 2 digit fips code with 3 digit county code.



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CAP Area Block (example)

<area>

<areaDesc>Southern States</areaDesc>

<geocode>fips6=13</geocode>

<geocode>fips6=02</geocode>

<geocode>fips6=28</geocode>

<geocode>fips6=37</geocode>

<geocode>fips6=45</geocode>

</area>



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Cascade Alerting Framework

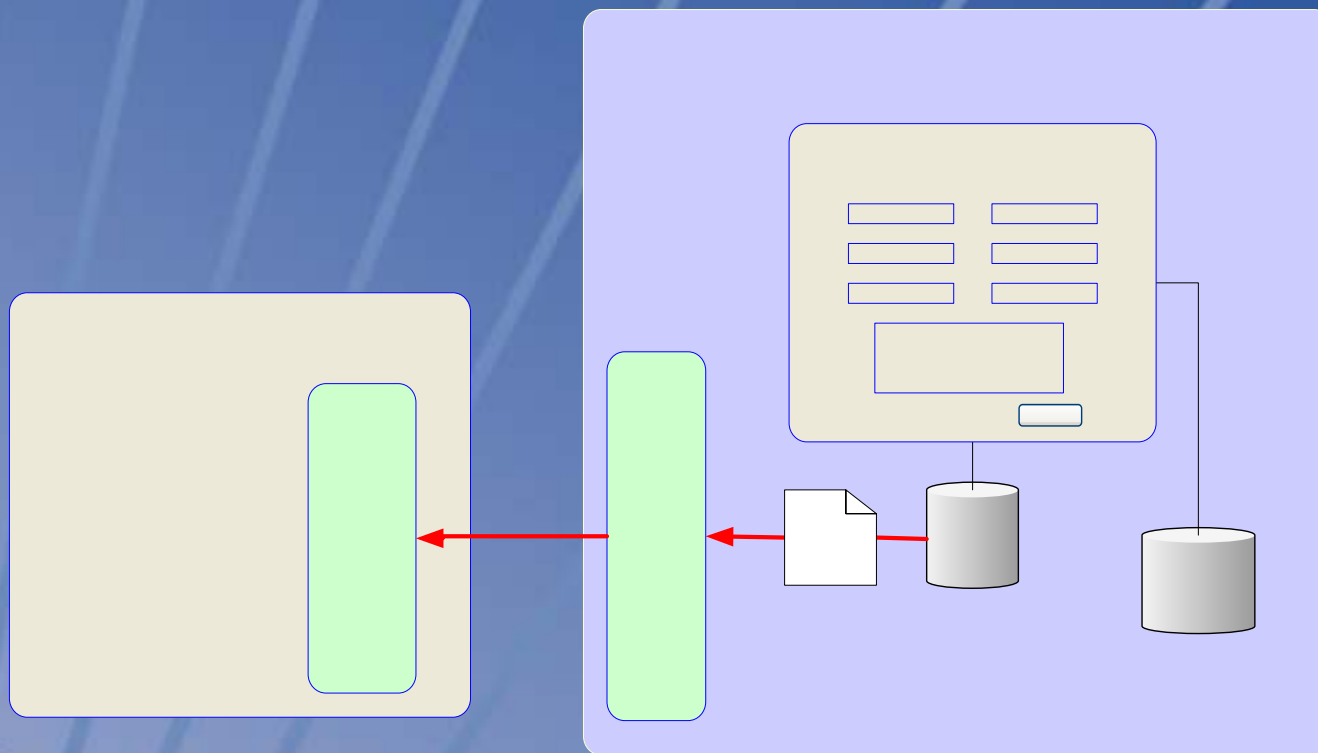
Alert Transmission



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Cascade Alerting Framework "transmission"



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Cascade Alerting Framework “transmission”

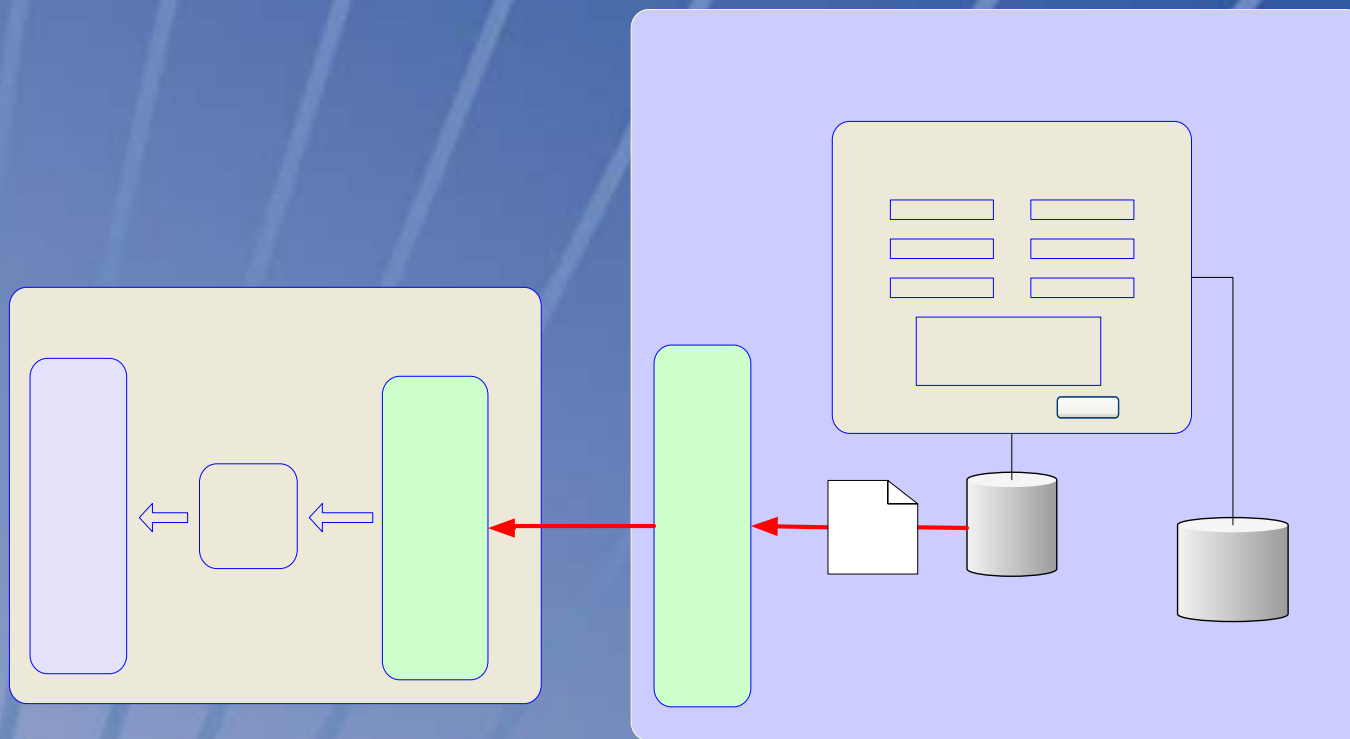
- Implements the PHIN Messaging System.
 - ◆ Guaranteed message transport
 - ◆ Non-repudiation
 - ◆ Secure (PKI based)
 - ◆ Platform and payload independent
- Key component in the PHIN architecture.



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Cascade Alerting Framework "transformation"



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Cascade Alerting Framework “transformation”

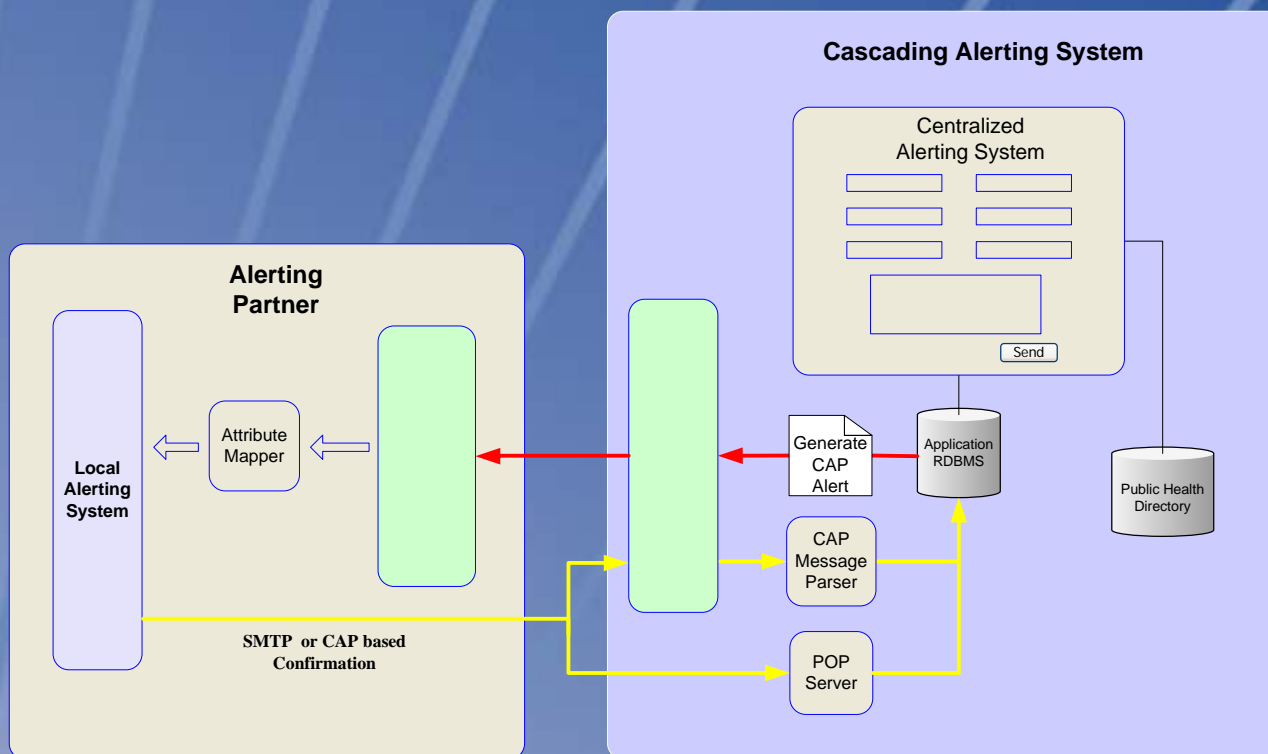
- Transform a CAP compliant message into a local Alerting System.
- Encourage Alerting System vendors to support the CAP standard.
- Development of shared Java based libraries to simplify integration.



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Cascade Alerting Framework "acknowledgement"



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Cascade Alerting Framework “acknowledgement”

- Issues with acknowledgements:
 - ◆ Stateless environment.
 - ◆ Inability of Alerting Systems to generate a CAP compliant acknowledgement.
- Two initial options:
 - ◆ Partners will generate a CAP compliant acknowledgement.
 - ◆ Partners will send a properly formatted SMTP based acknowledgment message.



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Interim Solutions?

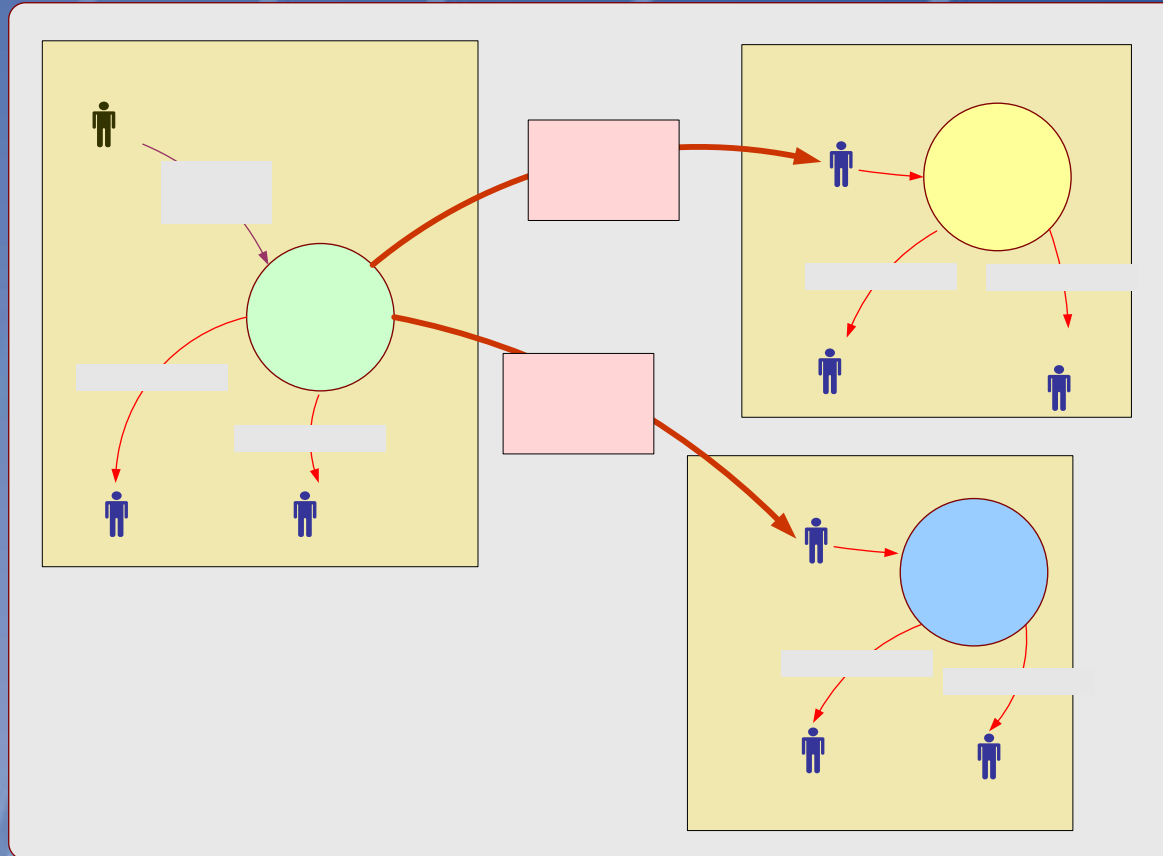
- Develop a centralized web-enabled direct alerting system to alert the 8 primary roles. The alert will include the additional roles and/or recipients and the alert message itself.
- Implement as many of the specifications currently being defined in the Protocols group.
- Develop a process for assigning people to the 8 primary roles.
- Develop and implement the system within next 6 months



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Interim Solutions "diagram"



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PHIN Alerting Vocabularies



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Vocabulary Overview

PHIN Alerting requires inter-organizational agreement on:

- Business rules and protocols
- Behavior of PHIN Alerting Systems in handling and processing alerts
- Semantics of inter-organizational messages
- Attribute values and their definitions



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Common Alerting Protocol

Vocabulary



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Common Alerting Protocol

- alert:status
- alert:msgType
- info:category
- info:urgency
- info:severity
- info:certainty



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alert:status

- **Actual** – Actionable by all targeted recipients
- **Exercise** – Actionable only by designated exercise participants
- **System** – For messages that support alert network internal functions
- **Test** – Technical testing only, all recipients disregard



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alert:msgType

- **Alert** – Initial information required attention by targeted recipients
- **Update** – Updates and supersedes the earlier message(s)
- **Cancel** – Cancels the earlier message(s)
- **Ack** – Acknowledges receipt and acceptance of the message(s)
- **Error** – Indicates rejection of the message(s)



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info:urgency

- **Immediate** – Responsive action should be taken immediately
- **Expected** – Responsive action should be taken soon. (within next hour)
- **Future** – Responsive action should be taken in the near future
- **Past** – Responsive action is no longer required
- **Unknown** – Urgency not known
- **PHIN Alert** – (PHIN Defined)
- **PHIN Advisory** – (PHIN Defined)
- **PHIN Notification** – (PHIN Defined)



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info:urgency

“PHIN defined”

- **PHIN Alert** – An alert requires public health activities to respond to a threat or public health event.
- **PHIN Advisory** – An advisory provides information that requires an awareness and/or preparatory activities by public health officials due to events that have or are suspected to occur.
- **PHIN Notification** – Communications that reference an originating notification, advisory or alert based upon changes to the originating specified set of criteria such as event severity, subject area, urgency, target population, location, communication method, area affected.



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info:severity

- **Extreme** – Extraordinary threat to life or property
- **Severe** – Significant threat to life or property
- **Moderate** – Possible threat to life or property
- **Minor** – Minimal threat to life or property
- **Unknown** – Severity unknown



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info:certainty

- Very Likely – greater than 85% or certain
- Likely – greater than 50%
- Possible – less than 50%
- Unlikely – not expected to occur 0%
- Unknown – certainty unknown



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Public Health Directory

Vocabulary



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Public Health Directory Schema

- Public Health Roles
- Public Health Organizations
- Public Health Organization Types
- Public Health Expertise



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Role / Job Title / Expertise

- **Public Health Role** - The public health functions for which a person is responsible. Intersection of program function and expertise
- **Job Title** - The position a person is hired into an organization. Usually relates to their responsibilities and pay level within the organization
- **Public Health Expertise** – The areas of expertise in which a person is trained and/or knowledgeable



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Public Health Roles

Our proposed Public Health Roles



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Public Health Role Contributors

- State and Local Informatics Consortium (SLHIC)
- CDC Office of Communications
- CDC Health Alert Network (HAN)
- CDC Epi-X
- Alerts and Communication Working Group



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Public Health Roles

1	BioTerrorism Coordinator	Responsible for the administration of all BioTerrorism related activities within the jurisdiction.	Local State Federal
2	Communicable/ Infectious Disease Coordinator	Responsible for the coordination of all communicable and infectious disease surveillance and investigations and response within the jurisdiction.	Local State Federal
3	Health Alert and Communications Coordinator	Responsible for the coordination, implementation, and maintenance of the public health alert and information network for the agency or jurisdiction.	Local State Federal
4	Environmental Health Director	Responsible for the coordination and direction of the jurisdiction's Environmental Health department.	Local State Federal



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Public Health Roles

5	Health Officer	Responsible for the direction and administration of the jurisdiction's Department of Health.	Local State Federal
6	Immunization Director	Responsible for management of immunization services within the jurisdiction.	Local State Federal
7	Laboratory Director	Responsible for the coordination of the laboratory testing and reporting for the agency or jurisdiction.	Local State Federal
8	Public Information Officer	Responsible for the coordination of public information and emergency risk communications for the jurisdiction.	Local State Federal



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Public Health Roles

9	Chief Epidemiologist	Responsible for the coordination of the public health surveillance, investigation and response activities within the jurisdiction..	Local State Federal
10	Public Health Administrator	Responsible for the management of the jurisdiction's Department of Public Health.	Local State Federal
11	Emergency Management Coordinator	Responsible for the coordination of emergency response activities. Coordinates response activities with other agencies and jurisdictions.	Local State Federal
12	Behavioral Health Director	Responsible for the coordination of the mental health services within the agency or jurisdiction.	Local State Federal



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Public Health Roles

13	Emergency Medical Services Authority	Coordinates all medical response activities. Coordinates with other agencies and jurisdictions and respond to medical emergencies.	Local State Federal
14	Strategic National Stockpile Coordinator	Responsible for the coordination of the pharmaceutical stockpile planning for the agency or jurisdiction.	Local State Federal
15	Emergency Training Coordinator	Responsible for the coordination of the WMD and other emergency training, education, and distance learning activities for the agency.	Local State Federal
16	Chief Veterinarian	Responsible for the coordination of animal disease outbreak response activities for the agency.	Local State Federal



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Public Health Roles

17	Weapons of Mass Destruction Coordinator	Responsible for the coordination of all WMD related activities for the agency.	Local State Federal
18	Public Health Nursing Director	Responsible for coordinating the jurisdiction's public health nursing activities.	Local State Federal
19	Quarantine Officer	Individual responsible for quarantine enactment and coordination at the local level to include international and travel issues for a region	Local State Federal
20	Laboratory BT	Responsible for the administration of BioTerrorism laboratory testing within the jurisdiction.	Local State Federal



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Public Health Roles

21	Medical Director	Responsible for medical/health services in the jurisdiction	Local State Federal
22	Medical Examiner/Coroner	Responsible for performing autopsies in the jurisdiction	Local
23	Poison Control Center	Office responsible for handling poison injury calls in a region	State Federal
24	Border Health Director Microbiologist	Responsible for cross-border health issues, coordination and communication	State Federal



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Public Health Roles

25	Microbiologist	A laboratorian that specializes in performing microbial testing for the jurisdiction.	Local State Federal
26	Epidemiologist	Individual who performs analysis of communicable disease and/or BT information for their jurisdiction.	Local State Federal
27	Technical Training Liaison	Coordinates training on the use of technical systems including those for IT Communication	Local State Federal
28	Emergency Operations Center Coordinator	Responsible for managing the EOC and for brining together the Individuals who participate as a members of the Emergency Operations Center	Local State Federal



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Public Health Roles

29	Medical Society	Organization responsible for maintaining directory information and communications with the physician community	Local State Federal
30	Infection Control Practitioner	Responsible for nosocomial and infectious disease in a hospital	
31	Emergency Room Director	Responsible for running the hospital emergency room	
32	School District Nurse	Responsible for school health in a school district	Local



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Public Health Roles

33	FBI WMD/BT Agent	Responsible for FBI activities and response in a WMD/BT event	State Federal
34	Public Health Investigator/Contact Tracer	Individual skilled at tracking down contacts to TB, HIV or STD cases	Local State Federal
35	Animal Control Director	Responsible for animal bites and quarantine	Local



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PHIN Vocabulary Service

PHIN VS



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PHINVS: A Coordinated System for Providing Standard Vocabulary

- Multi-partner participation in establishing and maintaining standard vocabulary
- Provisioning data store at CDC
- Enterprise vocabulary authoring/editing tool and editorial services at CDC
- User access (CDC, state, local, and other users) through Web Browser, Web Services, or E-mail
- Local authoring capability for extensions and other customizations consistent with standard vocabulary



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Roundtable Discussion



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Roundtable discussion topics

- Web-enabled client application
- Common Alerting Protocol (CAP)
- PHIN MS transport solution
- CAP integration into local alerting systems.
- Vocabulary review



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